U.S.ENVIRONMENTAL PROTECTION AGENCY NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY 540 S. MORRIS AVE., MONTGOMERY, AL 36115 U ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #1100243

Project:

Dimock Residential GW Site, Dimock, PA

Analysis method:

Actinides (Uranium) by Extraction Chromatography

Report ID:

1100243-U

Report type: Date reported:

Original 04/05/2012

Total pages in report:

38

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B2.01194D	FB01	PA:DIMOCK	WATER-DRINKING	01/23/2012	01/26/2012
B2.01195E	HW19	PA:DIMOCK	WATER-DRINKING	01/23/2012	01/26/2012
B2.01196F	HW19-P	PA:DIMOCK	WATER-DRINKING	01/23/2012	01/26/2012
B2.01197G	FB05	PA:DIMOCK	WATER-DRINKING	01/27/2012	01/31/2012
B2.01198H	HW24-P	PA:DIMOCK	WATER-DRINKING	01/27/2012	01/31/2012
B2.01199J	FB03	PA:DIMOCK	WATER-DRINKING	01/25/2012	01/31/2012
B2.01200H	HW01	PA:DIMOCK	WATER-DRINKING	01/25/2012	01/31/2012
B2.01201J	HW02	PA:DIMOCK	WATER-DRINKING	01/25/2012	01/31/2012
B2.01202K	HW02Z	PA:DIMOCK	WATER-DRINKING	01/25/2012	01/31/2012
B2,01203L	HW08A	PA:DIMOCK	WATER-DRINKING	01/25/2012	01/31/2012
B2,01204M	HW04	PA:DIMOCK	WATER-DRINKING	01/24/2012	01/31/2012
B2.01205N	HW05	PA:DIMOCK	WATER-DRINKING	01/26/2012	01/31/2012
B2.01206P	HW12	PA:DIMOCK	WATER-DRINKING	01/26/2012	01/31/2012
B2.01207Q	HW14	PA:DIMOCK	WATER-DRINKING	01/26/2012	01/31/2012
B2.01208R	HW14-P	PA:DIMOCK	WATER-DRINKING	01/26/2012	01/31/2012
B2.01209T	FB04	PA;DIMOCK	WATER-DRINKING	01/26/2012	01/31/2012
B2.01210K	EB01	PA:DIMOCK	WATER-DRINKING	01/28/2012	01/31/2012
B2.01211L	HW17	PA:DIMOCK	WATER-DRINKING	01/27/2012	01/31/2012
B2.01212M	HW24	PA:DIMOCK	WATER-DRINKING	01/27/2012	01/31/2012
B2.01213N	FB02	PA:DIMOCK	WATER-DRINKING	01/24/2012	01/31/2012

EXCEPTIONS

- 1. Packaging and shipping No problems were observed.
- 2. Documentation No problems were observed.
- 3. Sample preparation No problems were encountered.
- 4. Analysis Originally, sample B2.01202 had a yield that was below the lower acceptance limit. The sample was reanalyzed, and the results are reported in this data package. In addition, samples B2.01197 and B2.01197 DUP were loaded into the detectors incorrectly. The information was corrected to reflect the correct detector ID and its associated data with the correct sample.
- 5. Holding times No holding times were specified.

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QUALITY CONTROL

- 1. QC samples All QC analysis results met NAREL acceptance criteria.
- 2. Yields All chemical yields were within acceptance limits.
- 3. Instruments Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary F. Wisdom

Quality Assurance Manager, NAREL

John C. Griggs, Ph.D.

Director, Center for Environmental Radioanalytical

Laboratory Science

Original

GENERAL INFORMATION

SAMPLE TYPES

BLD Blind sample FBK Field blank SAM Normal sample

ANALYSIS QC TYPES

ANA Normal analysis
DUP Laboratory duplicate

LCS Laboratory control sample (blank spike)

MS Matrix spike

MSD Matrix spike duplicate

RBK Method blank

QUALITY INDICATORS

RPD Relative Percent Difference

%R Percent Recovery

Z Number of standard deviations by which a QC measurement differs from the expected value

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "Z scores." A Z score is the number of standard deviations by which the QC result differs from its ideal value. The score is considered acceptable if its absolute value is not greater than 3.

The Z score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference.

The Z score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference. When the precision of paired MS/MSD analyses is evaluated, the native sample activity is subtracted from each measured value and the net concentrations are then converted to total activities before the Z score is computed.

Each standard uncertainty used to compute a Z score includes an additional fixed term to represent sources of measurement error other than counting error. This additional term is not used in the evaluation of reagent blanks.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation.

SDG #1100243

ANALYSIS SUMMARY

Analysis Procedure:

NAREL U-EICHROM

Title:

Actinides (Uranium) by Extraction Chromatography

	Ţ	1	<u> </u>	Γ	I
NAREL Sample #	QC Type	Preparation Procedure	Date Completed	Assay Batch #	QC Batch #
B2.01194D		N/A	03/16/2012	0015805J	0008532A
B2.01195E		N/A	03/14/2012	0015798D	0008532A
B2.01196F		N/A	03/14/2012	0015798D	0008532A
B2.01197G		N/A	03/14/2012	0015798D	0008532A
B2.01197G	DUP	N/A	03/14/2012	0015798D	0008532A
B2.01198H		N/A	03/14/2012	0015798D	0008532A
B2.01199J	ŀ	N/A	03/14/2012	0015798D	0008532A
B2.01200H		N/A	03/15/2012	0015798D	0008532A
B2.01201J		N/A	03/14/2012	0015798D	0008532A
B2.01202K		N/A	04/04/2012	0015850P	0008597U
B2.01203L	,	N/A	03/14/2012	0015798D	0008532A
B2.01204M		N/A	03/14/2012	0015798D	0008532A
B2.01205N		N/A	03/16/2012	0015805J	0008532A
B2.01206P		N/A	03/16/2012	0015805J	0008532A
B2.01207Q		N/A	03/16/2012	0015805J	0008532A
B2.01208R		N/A	03/16/2012	0015805J	0008532A
B2.01209T		N/A	03/16/2012	0015805J	0008532A
B2.01210K		N/A	03/16/2012	0015805J	0008532A
B2.01211L		N/A	03/16/2012	0015805J	0008532A
B2.01212M		N/A	03/16/2012	0015805J	0008532A
B2.01213N		N/A	03/16/2012	0015805J	0008532A
B2.02561L *		N/A	04/04/2012	0015850P	0008597U
B2.02561L *	DUP	N/A	04/04/2012	0015850P	0008597U
LCS-00632939K *	LCS	N/A	03/16/2012	0015805J	0008532A
RBK-00632938J *	RBK	N/A	03/16/2012	0015805J	0008532A
LCS-00634463C *	LCS	N/A .	04/04/2012	0015850P	0008597U
RBK-00634462B *	RBK	N/A	04/04/2012	0015850P	0008597U

^{*} Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

PREPARATION METHOD(S) USED

Procedure ID	Title

Report: 1100243-U -4- Original

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

B2.01194D

QC batch #:

0008532A

Matrix:

WATER-DRINKING

Assay batch #:

0015805J

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

2.500e-01 L

Analysis procedure: Analyst:

NAREL U-EICHROM

Dry/wet weight: Ash/dry weight:

N/A N/A

QC type:

AS ANA

Sample description:

N/A

Comment:

Aqueous

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
03/15/2012 15:55	1000.0	AS33	GVJ

ANALYTICAL RESULTS

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	5.99e-02	7.1e-02	1.0e-01	PCI/L	03/15/2012 15:55 CDT
U235	2.05e-02	5.6e-02	1.0e-01	PCI/L	03/15/2012 15:55 CDT
U238	1.71e-02	4.7e-02	8.4e-02	PCI/L	03/15/2012 15:55 CDT

Original

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

B2.01195E

QC batch #:

0008532A

Matrix:

WATER-DRINKING

Assay batch #:

0015798D

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

2.500e-01 L N/A Analysis procedure:

NAREL U-EICHROM

Dry/wet weight: Ash/dry weight:

N/A N/A Analyst: QC type:

A\$ ANA

Sample description: Comment: N/A N/A

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
03/13/2012 14:24	1000.0	AS73	GVJ

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	3.12e-01	1.4e-01	1.3e-01	PCI/L	03/13/2012 14:24 CDT
U235	-4.56e-03	5.4e-02	1.3e-01	PCI/L	03/13/2012 14:24 CDT
U238	1.52e-01	9.0e-02	7.5e-02	PCI/L	03/13/2012 14:24 CDT

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

Comment:

B2.01196F

OC batch #:

0008532A

Matrix:

WATER-DRINKING

Assay batch #:

0015798D

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

2.500e-01 L

Analysis procedure: Analyst:

NAREL U-EICHROM

Dry/wet weight:

N/A N/A

QC type:

AS ANA

Ash/dry weight: Sample description:

N/A N/A

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
03/13/2012 14:24	1000.0	AS74	GVJ

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234 *	2.83e-01	1.2e-01	6.6e-02	PCI/L	03/13/2012 14:24 CDT
U235	2.75e-02	4.9e-02	5.9e-02	PCI/L	03/13/2012 14:24 CDT
U238	1.41e-01	9.1e-02	9.5e-02	PCI/L	03/13/2012 14:24 CDT

^{*} An asterisk indicates a result that may be significantly under or overestimated

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

Comment:

B2.01197G

QC batch #:

0008532A

Matrix:

WATER-DRINKING

Assay batch #:

0015798D

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

2.500e-01 L N/A

Analysis procedure:

NAREL U-EICHROM

Dry/wet weight:

N/A

Analyst: QC type: AS ANA

Ash/dry weight: Sample description:

N/A

Aqueous

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
03/13/2012 14:24	1000.0	AS78	GVJ

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	5.10e-02	7.1e-02	1.1e-01	PCI/L	03/13/2012 14:24 CDT
U235	-1.11e-02	3.8e-02	1.1e-01	PCI/L	03/13/2012 14:24 CDT
U238	1.21e-01	9.5e-02	1.1e-01	PCI/L	03/13/2012 14:24 CDT

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

B2.01197G

OC batch #:

0008532A

Matrix:

WATER-DRINKING

Assay batch #:

0015798D

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed: Dry/wet weight:

2.500e-01 L

Analysis procedure: Analyst:

NAREL U-EICHROM AS

Ash/dry weight:

N/A N/A

QC type:

DUP

Sample description:

N/A

Comment:

Aqueous

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
03/13/2012 14:24	1000.0	AS79	GVJ

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	4.14e-02	5.8e-02	8.8e-02	PCI/L	03/13/2012 14:24 CDT
U235	1.80e-02	4.9e-02	8.9e-02	PCI/L	03/13/2012 14:24 CDT
U238	4.14e-02	5.2e-02	6.5e-02	PCI/L	03/13/2012 14:24 CDT

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #: Matrix:

B2.01198H

QC batch #:

0008532A

WATER-DRINKING

Assay batch #:

0015798D

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed: Dry/wet weight:

2.500e-01 L

Analysis procedure:

NAREL U-EICHROM

Ash/dry weight:

N/A N/A N/A

Analyst: QC type: AS ANA

Sample description: Comment: N/A

COUNTING INFORMATION

	Date and time	Duration (min)	Detector ID	Operator
ĺ	03/13/2012 14:24	1000.0	AS80	GVJ

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	7.58e-02	6.9e-02	7.8e-02	PCI/L	03/13/2012 14:24 CDT
U235	1.91e-02	5.2e-02	9.4e-02	PCI/L	03/13/2012 14:24 CDT
U238	6.39e-02	6.5e-02	7.8e-02	PCI/L	03/13/2012 14:24 CDT

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #: Matrix:

B2.01199J WATER-DRINKING QC batch #: Assay batch #: 0008532A

SAM

Prep procedure:

0015798D

Sample type: Amount analyzed:

N/A

Dry/wet weight:

2.500e-01 L N/A

Analysis procedure: Analyst:

NAREL U-EICHROM AS

Ash/dry weight:

N/A

QC type:

ANA

Sample description: Comment:

N/A Aqueous

COUNTING INFORMATION

	Date and time	Duration (min)	Detector ID	Operator
ſ	03/13/2012 14:24	1000.0	AS81	GVJ

ANALYTICAL RESULTS

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
U234	4.54e-02	6.3e-02	8.9e-02	PCI/L	03/13/2012 14:24 CDT
U235	1.63e-02	4.7e-02	7.1e-02	PCI/L	03/13/2012 14:24 CDT
U238	3.63e-02	5.6e-02	7.8e-02	PCI/L	03/13/2012 14:24 CDT

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SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

B2.01200H

QC batch #:

0008532A

Matrix:

WATER-DRINKING

Assay batch #:

0015798D

Sample type: Amount analyzed: SAM

Prep procedure:

N/A

Dry/wet weight:

2.500e-01 L N/A

Analysis procedure: Analyst:

NAREL U-EICHROM

Ash/dry weight:

N/A

QC type:

AS ANA

Sample description: Comment:

N/A N/A

COUNTING INFORMATION

	Date and time	Duration (min)	Detector ID	Operator
Ī	03/14/2012 15:51	1000.0	AS82	GVJ

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	8.35e-02	8.0e-02	8.4e-02	PCI/L	03/14/2012 15:51 CDT
U235	3.53e-02	6.2e-02	7.6e-02	PCI/L	03/14/2012 15:51 CDT
U238	4.42e-02	6.9e-02	1.1e-01	PCI/L	03/14/2012 15:51 CDT

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

B2.01201J

QC batch #:

0008532A

Matrix:

WATER-DRINKING

Assay batch #:

0015798D

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed: Dry/wet weight:

2.500e-01 L N/A Analysis procedure:

NAREL U-EICHROM

Dry/wet weight:

N/A N/A Analyst: QC type:

AS ANA

Ash/dry weight: Sample description:

N/A N/A

Comment: N/A

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
03/13/2012 14:24	1000.0	AS83	GVJ

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	3.53e+00	5.2e-01	7.6e-02	PCI/L	03/13/2012 14:24 CDT
U235	7.46e-02	8.0e-02	9.1e-02	PCI/L	03/13/2012 14:24 CDT
U238	1.09e+00	2.6e-01	7.6e-02	PCI/L	03/13/2012 14:24 CDT

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

B2.01202K

QC batch #:

0008597U

Matrix:

WATER-DRINKING

Assay batch #:

0015850P

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

2.500e-01 L N/A

Analysis procedure:

NAREL U-EICHROM

Dry/wet weight: Ash/dry weight:

N/A

Analyst: QC type: AS ANA

Sample description: Comment:

N/A N/A

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/03/2012 11:44	1000.0	AS97	RCL

ANALYTICAL RESULTS

Analyte		Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	*	3.39e+00	4.9e-01	7.2e-02	PCI/L	04/03/2012 11:44 CDT
U235	*	1.45e-01	1.0e-01	8.6e-02	PCI/L	04/03/2012 11:44 CDT
U238	*	1.37e+00	2.9e-01	9.1e-02	PCI/L	04/03/2012 11:44 CDT

^{*} An asterisk indicates a result that may be significantly under or overestimated

Original

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

B2.01203L

QC batch #:

0008532A

Matrix:

WATER-DRINKING

Assay batch #:

0015798D

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

2.500e-01 L

Analysis procedure: Analyst:

NAREL U-EICHROM

Dry/wet weight:

N/A

QC type:

AS ANA

Ash/dry weight: Sample description: N/A N/A

Comment:

N/A

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
03/13/2012 14:24	1000.0	AS85	GVJ

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	1.89e-01	1.1e-01	7.9e-02	PCI/L	03/13/2012 14:24 CDT
U235	2.77e-02	6.0e-02	9.5e-02	PCI/L	03/13/2012 14:24 CDT
U238	5.54e-02	6.3e-02	6.0e-02	PCI/L	03/13/2012 14:24 CDT

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

B2.01204M

QC batch #:

0008532A

Matrix:

WATER-DRINKING

Assay batch #:

0015798D

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

2.500e-01 L N/A

Analysis procedure:

NAREL U-EICHROM

Dry/wet weight: Ash/dry weight:

N/A

Analyst: QC type: AS ANA

Sample description: Comment:

N/A N/A

COUNTING INFORMATION

	Date and time	Duration (min)	Detector ID	Operator
ſ	03/13/2012 14:24	1000.0	AS86	GVJ

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	6.19e-01	2.0e-01	6.5e-02	PCI/L	03/13/2012 14:24 CDT
U235	2.41e-02	6.6e-02	1,2e-01	PCI/L	03/13/2012 14:24 CDT
U238	5.29e-01	1.9e-01	6.5e-02	PCI/L	03/13/2012 14:24 CDT

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

B2.01205N

QC batch #:

0008532A

Matrix:

WATER-DRINKING

Assay batch #:

0015805J

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed: Dry/wet weight:

2.500e-01 L N/A

Analysis procedure: Analyst:

NAREL U-EICHROM

Ash/dry weight:

N/A N/A

QC type:

AS ANA

Sample description:

Comment: N/A

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
03/15/2012 15:55	1000.0	AS35	GVJ

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
U234	3.25e+00	4.9e-01	8.7e-02	PCI/L	03/15/2012 15:55 CDT
U235	4.78e-02	6.5e-02	6.9e-02	PCI/L	03/15/2012 15:55 CDT
U238	1.30e+00	2.9e-01	7.6e-02	PCI/L	03/15/2012 15:55 CDT

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

B2.01206P

OC batch #:

0008532A

Matrix:

WATER-DRINKING

Assay batch #:

0015805J

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

2.500e-01 L N/A

Analysis procedure:

NAREL U-EICHROM

Dry/wet weight: Ash/dry weight:

N/A

Analyst: QC type: AS ANA

Sample description: Comment:

N/A N/A

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
03/15/2012 15:55	1000.0	AS36	GVJ

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	2.18e+00	3.8e-01	9.4e-02	PCI/L	03/15/2012 15:55 CDT
U235	6.25e-02	7.1e-02	6.7e-02	PCI/L	03/15/2012 15:55 CDT
U238	8.34e-01	2.2e-01	5.6e-02	PCI/L	03/15/2012 15:55 CDT

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

B2.01207Q

QC batch #:

0008532A

Matrix:

WATER-DRINKING

Assay batch #:

0015805J

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

2.500e-01 L N/A Analysis procedure: Analyst: NAREL U-EICHROM AS

Dry/wet weight: Ash/dry weight:

N/A N/A N/A

QC type:

ANA

Sample description: Comment: N/A N/A

COUNTING INFORMATION

	Date and time	Duration (min)	Detector ID	Operator
ſ	03/15/2012 15:55	1000.0	AS37	GVJ

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234 *	2.70e-01	1.2e-01	8.3e-02	PCI/L	03/15/2012 15:55 CDT
U235	2.02e-02	5.5e-02	9.9e-02	PCI/L	03/15/2012 15:55 CDT
U238	1.64e-01	9.6e-02	5.5e-02	PCI/L	03/15/2012 15:55 CDT

^{*} An asterisk indicates a result that may be significantly under or overestimated

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

B2.01208R

QC batch #:

0008532A

Matrix:

WATER-DRINKING

Assay batch #:

000555211 0015805J

Sample type:

Comment:

SAM

Prep procedure:

N/A

Amount analyzed:

2.500e-01 L N/A Analysis procedure: Analyst:

NAREL U-EICHROM

Dry/wet weight: Ash/dry weight:

N/A N/A

QC type:

AS ANA

Sample description:

N/A N/A

N/A

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
03/15/2012 15:55	1000.0	AS38	GVJ

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
U234 *	2.71e-01	1.3e-01	1.1e-01	PCI/L	03/15/2012 15:55 CDT
U235	-5.32e-03	5.1e-02	1.2e-01	PCI/L	03/15/2012 15:55 CDT
U238	2.00e-01	1.1e-01	9.6e-02	PÇI/L	03/15/2012 15:55 CDT

^{*} An asterisk indicates a result that may be significantly under or overestimated

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

B2.01209T

QC batch #:

0008532A

NAREL U-EICHROM

Matrix:

WATER-DRINKING

Assay batch #:

0015805J

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

2.500e-01 L

Analysis procedure:

AS

Dry/wet weight: Ash/dry weight: N/A N/A Analyst: QC type:

ANA

Sample description:

N/A

Comment:

Aqueous

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
03/15/2012 15:55	1000.0	AS41	GVJ

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	3.15e-02	5.6e-02	8.9e-02	PCI/L	03/15/2012 15:55 CDT
U235	0.00e+00	3.4e-02	7.0e-02	PCI/L	03/15/2012 15:55 CDT
U238	2.25e-02	4.9e-02	7.7e-02	PCI/L	03/15/2012 15:55 CDT

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

B2.01210K

QC batch #:

0008532A

Matrix:

WATER-DRINKING SAM

Assay batch #:

0015805J

Sample type: Amount analyzed:

Prep procedure:

N/A

Dry/wet weight:

2.500e-01 L N/A

Analysis procedure: Analyst:

NAREL U-EICHROM AS

Ash/dry weight:

N/A

QC type:

ANA

Sample description: Comment:

N/A Aqueous

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator	
03/15/2012 15:55	1000.0	AS48	GVJ	

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	7.25e-02	6.9e-02	7.3e-02	PCI/L	03/15/2012 15:55 CDT
U235	-5.11e-03	3.4e-02	8.8e-02	PCI/L	03/15/2012 15:55 CDT
U238	4.27e-02	5.9e-02	8.4e-02	PCI/L	03/15/2012 15:55 CDT

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

B2.01211L

QC batch #:

0008532A

Matrix:

WATER-DRINKING

Assay batch #:

0015805J

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

2.500e-01 L

Analysis procedure:

NAREL U-EICHROM

Dry/wet weight: Ash/dry weight:

N/A N/A Analyst: QC type:

AS ANA

Sample description:

N/A N/A N/A

Sample description: N
Comment: N

COUNTING INFORMATION

	Date and time	Duration (min)	Detector ID	Operator	
ĺ	03/15/2012 15:55	1000.0	AS73	GVJ	

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	2.65e+00	4.0e-01	1.3e-01	PCI/L	03/15/2012 15:55 CDT
U235	3.53e-02	6.9e-02	1.2e-01	PCI/L	03/15/2012 15:55 CDT
U238	1.51e+00	2.8e-01	7.2e-02	PCI/L	03/15/2012 15:55 CDT

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

B2.01212M

QC batch #:

0008532A

Matrix:

WATER-DRINKING

Assay batch #:

0015805J

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

2.500e-01 L N/A Analysis procedure: Analyst:

NAREL U-EICHROM AS

Dry/wet weight: Ash/dry weight:

N/A N/A

QC type:

AS ANA

Sample description: Comment: N/A N/A

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
03/15/2012 15:55	1000.0	AS74	GVJ

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	6.03e-02	5.7e-02	6.1e-02	PCI/L	03/15/2012 15:55 CDT
U235	3.82e-02	5.2e-02	5.5e-02	PCI/L	03/15/2012 15:55 CDT
U238	3.55e-02	5.5e-02	8.8e-02	PCI/L	03/15/2012 15:55 CDT

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

B2.01213N

QC batch #:

0008532A

Matrix:

WATER-DRINKING

Assay batch #:

0015805J

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed: Dry/wet weight:

2.500e-01 L N/A

Analysis procedure:

NAREL U-EICHROM

Ash/dry weight:

N/A

Analyst: QC type: AS ANA

Sample description: Comment:

N/A Aqueous

COUNTING INFORMATION

Date and time Duration (min)		Detector ID	Operator
03/15/2012 15:55	03/15/2012 15:55 1000.0		GVJ

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	5.07e-02	7.1e-02	1.1e-01	PCI/L	03/15/2012 15:55 CDT
U235	2.21e-02	6.0e-02	1.1e-01	PCI/L	03/15/2012 15:55 CDT
U238	-1.84e-02	3.4e-02	1.1e-01	PCI/L	03/15/2012 15:55 CDT

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

B2.02561L

QC batch #:

0008597U

Matrix:

WATER-DRINKING Assay batch #:

0015850P

Sample type:

SAM

Prep procedure:

N/A NAREL U-EICHROM

Amount analyzed: Dry/wet weight:

2.500e-01 L N/A Analysis procedure: Analyst:

AS

Ash/dry weight:

N/A N/A

QC type:

ANA

Sample description: Comment: N/A N/A

This sample is not in SDG #1100243

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator	
04/03/2012 11:44	1000.0	AS101	RCL	

Analyte		Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	*	8.75e-02	8.0e-02	9.1e-02	PCI/L	04/03/2012 11:44 CDT
U235	*	0.00e+00	3.5e-02	7.2e-02	PCI/L	04/03/2012 11:44 CDT
U238	*	6.45e-02	6.9e-02	7.9e-02	PCI/L	04/03/2012 11:44 CDT

^{*} An asterisk indicates a result that may be significantly under or overestimated

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #: B2.02561L QC batch #: 0008597U

Matrix: WATER-DRINKING Assay batch #: 0015850P

Sample type: SAM Prep procedure: N/A

Amount analyzed: 2.500e-01 L Analysis procedure: NAREL U-EICHROM

Dry/wet weight: N/A Analyst: AS
Ash/dry weight: N/A QC type: DUP

Sample description: N/A
Comment: N/A

This sample is not in SDG #1100243

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator	
04/03/2012 11:44	1000.0	AS102	RCL	

ANALYTICAL RESULTS

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	5.46e-02	6.2e-02	5.9e-02	PCI/L	04/03/2012 11:44 CDT
U235	3.27e-02	5.8e-02	7.1e-02	PCI/L	04/03/2012 11:44 CDT
U238	2.27e-02	4.9e-02	7.8e-02	PCI/L	04/03/2012 11:44 CDT

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SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

LCS-00632939K

QC batch #:

0008532A

Matrix:

N/A

Assay batch #:

00053327X

Sample type:

N/A

Prep procedure:

N/A

Amount analyzed:

1.000e+00 SAMP N/A Analysis procedure: Analyst:

NAREL U-EICHROM AS

Dry/wet weight: Ash/dry weight:

N/A N/A

QC type:

LCS

Sample description: Comment: N/A N/A

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
03/15/2012 15:55	1000.0	AS79	GVJ

Analyte	Activity	± 2 σ Uncertainty	MDC	Unit	Date
U234	2.20e+00	2.2e-01	2.1e-02	PCI	03/15/2012 15:55 CDT
U235	9.37e-02	3.7e-02	2.1e-02	PCI	03/15/2012 15:55 CDT
U238	2.14e+00	2.2e-01	1.5e-02	PCI	03/15/2012 15:55 CDT

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

RBK-00632938J

QC batch #:

0008532A

Matrix:

N/A

Assay batch #:

0015805J

Sample type:

N/A

Prep procedure:

N/A

Amount analyzed:

1.000e+00 SAMP

Analysis procedure:

NAREL U-EICHROM

Dry/wet weight: Ash/dry weight:

N/A

Analyst: QC type:

AS **RBK**

Sample description:

N/A N/A N/A

Comment:

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
03/15/2012 15:55	1000.0	AS99	GVJ

Analyte	Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	2.16e-03	9.6e-03	1.9e-02	PCI	03/15/2012 15:55 CDT
U235	3.87e-03	1.1e-02	1.7e-02	PCI	03/15/2012 15:55 CDT
U238	0.00e+00	1.0e-02	2.3e-02	PCI	03/15/2012 15:55 CDT

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

Comment:

LCS-00634463C

QC batch #:

0008597U

Matrix:

N/A

Assay batch #:

0015850P

Sample type:

N/A

Prep procedure:

N/A

Amount analyzed:

1.000e+00 SAMP

Analysis procedure:

NAREL U-EICHROM

Dry/wet weight: Ash/dry weight:

N/A

Analyst: QC type:

AS LCS

Sample description:

N/A N/A N/A

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/03/2012 11:44	1000.0	AS109	RCL

Analyte		Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	*	1.93e+00	2.1e-01	1.7e-02	PCI	04/03/2012 11:44 CDT
U235	*	8.22e-02	3.7e-02	2.1e-02	PCI	04/03/2012 11:44 CDT
U238	*	1.94e+00	2.1e-01	1.7e-02	PCI	04/03/2012 11:44 CDT

^{*} An asterisk indicates a result that may be significantly under or overestimated

SDG #1100243

SAMPLE ANALYSIS REPORT

Sample #:

RBK-00634462B

QC batch #:

0008597U

Matrix:

N/A

Assay batch #:

0015850P

Sample type:

N/A

Prep procedure:

N/A

Amount analyzed: Dry/wet weight:

1.000e+00 SAMP N/A

Analysis procedure: Analyst:

NAREL U-EICHROM AS

Ash/dry weight:

N/A N/A

QC type:

RBK

Sample description:

Comment: N/A

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/03/2012 11:44	1000.0	AS110	RCL

ANALYTICAL RESULTS

Analyte		Activity	±2 σ Uncertainty	MDC	Unit	Date
U234	*	1.16e-02	1.3e-02	1.2e-02	PCI	04/03/2012 11:44 CDT
U235	*	2.31e-03	1.0e-02	2.0e-02	PCI	04/03/2012 11:44 CDT
U238	*	9.64e-04	8.8e-03	1.9e-02	PCI	04/03/2012 11:44 CDT

^{*} An asterisk indicates a result that may be significantly under or overestimated

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SDG 1100243

QC BATCH SUMMARY

QC batch #:

0008532A

Preparation procedure:

N/A

Analysis procedure:

NAREL U-EICHROM

	QC		-	
NAREL Sample #	Туре	Yield (%)	± 2 σ Uncertainty (%)	Analyst
B2.01194D		89.32 %	7.52 %	AS
B2.01195E		81.90 %	6.62 %	AS
B2.01196F		80.40 %	6.50 %	AS
B2.01197G		82.58 %	7.13 %	AS
B2.01197G	DUP	82.30 %	6.63 %	AS
B2.01198H		75.70 %	6.20 %	AS
B2.01199J		83.28 %	7.14 %	AS
B2.01200H		77.85 %	6.84 %	AS
B2.01201J		85.75 %	7.30 %	AS
B2.01203L		84.88 %	7.32 %	AS
B2.01204M		78.70 %	6.98 %	AS
B2.01205N		84.92 %	7.23 %	AS
B2.01206P		83.44 %	7.05 %	AS
B2.01207Q		89.96 %	7.53 %	AS
B2.01208R		86.08 %	7.34 %	AS
B2.01209T		82.90 %	7.08 %	AS
B2.01210K		87.64 %	7.36 %	AS
B2.01211L		84.73 %	6.78 %	AS
B2.01212M		86.59 %	6.85 %	AS
B2.01213N		83.16 %	7.16 %	AS
LCS-00632939K *	LCS	87.13 %	6.90 %	AS
RBK-00632938J*	RBK	87.66 %	7.39 %	AS

^{*} Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

SDG 1100243

QC BATCH SUMMARY

QC batch #:

0008597U

Preparation procedure:

N/A

Analysis procedure:

NAREL U-EICHROM

NAREL Sample #	QC Type	Yield (%)	±2 σ Uncertainty (%)	Analyst
B2.01202K		90.15 %	7.53 %	AS
B2.02561L*		82.92 %	7.14 %	AS
B2.02561L*	DUP	85.43 %	7.32 %	AS
LCS-00634463C *	LCS	91.28 %	7.54 %	AS
RBK-00634462B *	RBK	101.11%	8.25 %	AS

^{*} Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

National Air and Radiation Environmental Laboratory QC Batch Report

QC Batch #: 0008532A

Analytical Method: NAREL U-EICHROM

METHOD BLANKS (PCI)

Sample ID	Nuclide	Activity ± 2σ	Prep Date	Flags
	U234 U235 U238	2.16e-03 ± 9.6e-03 3.87e-03 ± 1.1e-02 0.00e+00 ± 1.0e-02	2012-03-08	OK

LABORATORY DUPLICATES (PCI/L)

Sample ID	Nuclide	Original ± 2σ	Duplicate ± 2σ	RPD	Z
B2.01197G	ช235	-1.11e-02 ± 3.8e-02	4.14e-02 ± 5.8e-02 1.80e-02 ± 4.9e-02 4.14e-02 ± 5.2e-02	840.77	(

LAB CONTROL SAMPLES (PCI)

Sample ID	Nuclide	Amt Added ± 2σ	Measured ± 2σ	%R	Z
00632939K	U234 U235 U238	1.96e+00 ± 2.2% 9.39e-02 ± 2.2% 2.04e+00 ± 2.2%	2.20e+00 ± 2.2e-01 9.37e-02 ± 3.7e-02 2.14e+00 ± 2.2e-01	99.84	-0.01 OK

Analyst:

QA Officer:

3/22/2012

3/22/12

National Air and Radiation Environmental Laboratory QC Batch Report

QC Batch #: 0008597U

Analytical Method: NAREL U-EICHROM

METHOD BLANKS (PCI)

Sample ID	Nuclide	Activity ± 2σ	Prep Date	Flags
00634462B	U234 U235 U238	1.16e-02 ± 1.3e-02 2.31e-03 ± 1.0e-02 9.64e-04 ± 8.8e-03	2012-03-28	ū

LABORATORY DUPLICATES (PCI/L)

Sample ID Nuclide	Original ± 2σ	Duplicate ± 2σ	RPD	Z
B2.02561L U234 B2.02561L U235 B2.02561L U238	0.00e+00 ± 3.5e-02	5.46e-02 ± 6.2e-02 3.27e-02 ± 5.8e-02 2.27e-02 ± 4.9e-02	200.00	-0.65 OK 0.97 OK -0.99 OK

LAB CONTROL SAMPLES (PCI)

Sample ID	Nuclide	Amt Added ± 2 σ	Measured ± 2σ	%R	Z
00634463C	U234 U235 U238	1.96e+00 ± 2.2% 9.39e-02 ± 2.2% 2.04e+00 ± 2.2%	1.93e+00 ± 2.1e-01 8.22e-02 ± 3.7e-02 ,1.94e+00 ± 2.1e-01	87.59	-0.27 OK -0.62 OK -0.88 OK

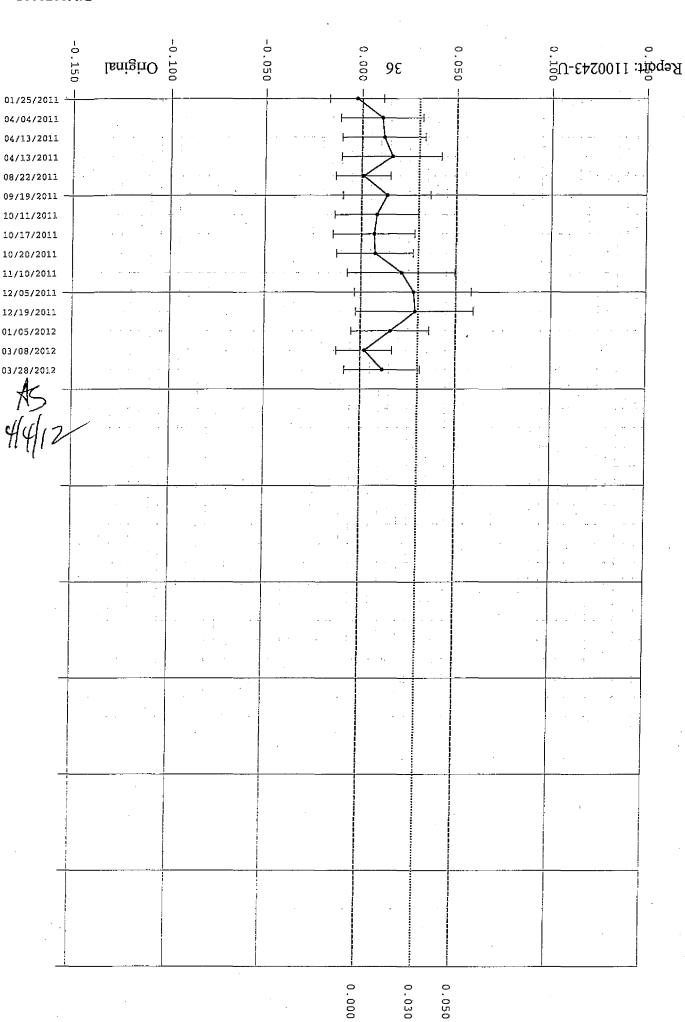
Analyst:

Calleb Albert

QA Officer:

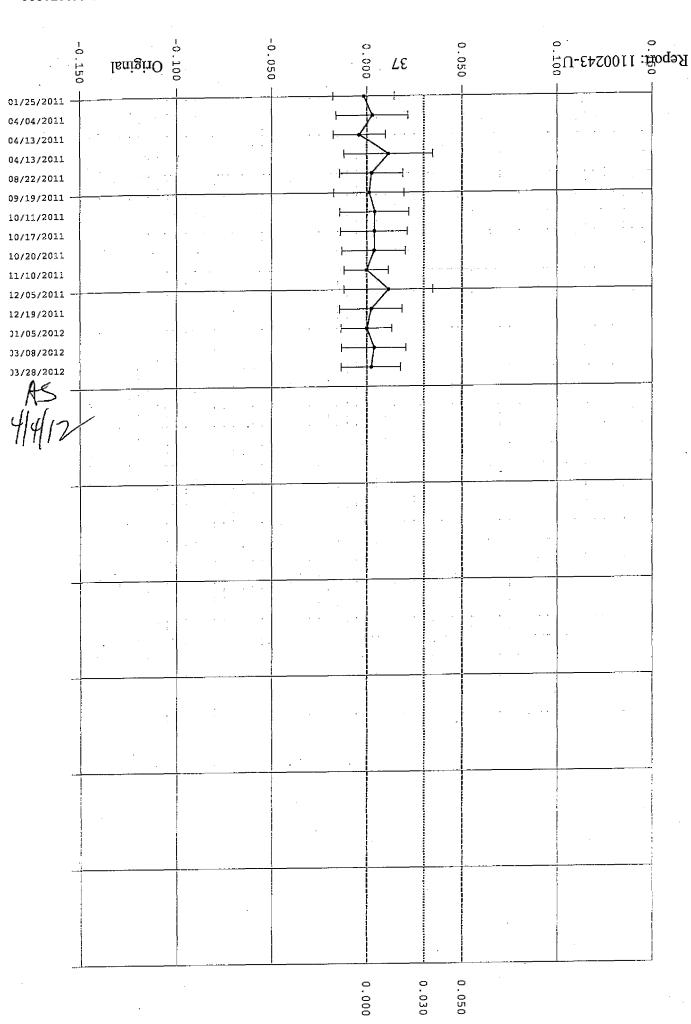
4/4/2012

4/5//2



Method: NAREL U-EICHROM Analyst: Smith, Albert

Method Blanks Analyte: U234



Method Blanks

Analyte: U235 Method: NAREL U-EICHROM

Analyst: Smith, Albert

